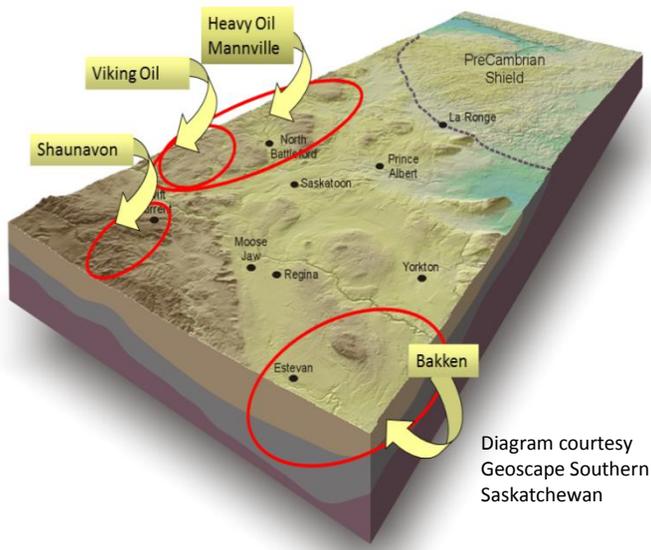


Saskatchewan's Active Oil Plays



Saskatchewan is Canada's second-largest oil producer, with about 15% of Canadian crude oil production, and the sixth-largest oil-producing jurisdiction in North America.

In 2014, Saskatchewan saw high activity levels in petroleum exploration and development, with an estimated 3,645 oil wells drilled, including 2,829 horizontal wells. Up until November 30, 2014, the province saw an average of 513,300 barrels of crude oil produced per day.

While far from the only active oil plays in the province, the four oil plays indicated in the figure above are attracting a particular amount of interest.

Viking Oil

- The Cretaceous Viking Formation is a geologically complex unit consisting of interbedded, mainly marine-influenced fine-grained sandstones, siltstones and mudstones sandwiched between two marine shales. The Viking extends over most of Saskatchewan, but hydrocarbon production is restricted to west-central Saskatchewan in the Kindersley-Doddsland area.

- Oil was discovered in the Viking in the 1950s. Proven initial oil-in-place is estimated at 3.0 billion barrels (478 million m³), with recoverable reserves based on conventional technology (vertical wells and waterflood) estimated at 296 million barrels (47.1 million m³).
- From the period of 2007 to 2012, the recoverable reserves have increased by approximately 82 million barrels (13 million m³) or 38% and the majority of this increase can be attributed to horizontal drilling and multi-stage frac completions.
- Approximately 3,880 horizontal wells have been drilled into the Viking since December 2007. These wells have produced approximately 44 million barrels of oil (7.0 million m³) and 45.2 billion ft³ of gas (1,274 million m³).
- The depth of the Viking production ranges from 1,840 feet (561 metres) to 2,562 feet (781 metres). The average API gravity of the oil is 36°.

Shaunavon

- The Jurassic Shaunavon Formation has been a known oil producer in southwestern Saskatchewan for 50 years. Initial production came from the Delta field in 1952 and was followed shortly thereafter by a second producer in the Eastend field.
- There have been approximately 3,431 wells drilled in the Shaunavon, with total production around 420 million barrels (66.8 million m³) of 22° API oil.
- Since January 1, 2010, horizontal wells in the Shaunavon have produced around 28.5 million barrels (4.5 million m³) of oil, and over 790 wells were drilled to exploit the clastic/carbonate upper member of the formation.
- Over 500 horizontal wells have been drilled into the low permeability reservoirs of the Lower Shaunavon since 2007, with total oil production of more than 15.1 million barrels (2.4 million m³).

Bakken

- The Mississippian-Devonian Bakken, in southeast Saskatchewan, saw limited production in the 1950s. Since 2005, technological innovation has led to a major increase in production.
- Currently there are approximately 2,591 producing Bakken oil wells, up from just 75 in 2004.
- Wells are primarily horizontal with a multi-stage frac completion.
- In 2014 from January to November 30, the Bakken produced approximately 20.5 million barrels of oil (3.3 million m³) and currently produces over 61,373 barrels per day (9,754 m³ per day).
- The 38° API oil is hosted in very fine-grained dolomitic sandstones and siltstones that typically have about 10 to 15 per cent intergranular porosity and permeability less than one millidarcy.

Heavy Oil Mannville

- Oil was first produced from the Cretaceous Mannville Group in 1945, and the proven initial oil-in-place is estimated at 21.5 billion barrels (3.4 billion m³). Since January 1, 2012, approximately 2,600 Mannville Group wells have been drilled.

- To November 2014, the Mannville Group had over 27,000 wells drilled and produced 1.75 billion barrels (279 million m³) of oil and 2.3 trillion ft³ (65 billion m³) of gas.
- The Mannville Group is a very prolific heavy oil producer, distributed across the Lloydminster and Kindersley areas (Townships 24 to 68). In areas north of Kindersley and Lloydminster (Townships 52 to 68), Mannville Group sandstones also host natural gas. There has also been a bitumen resource identified within the Mannville Group, north of the Clearwater River, between Townships 94 and 95.
- The Mannville Group infills and overlays topography of valleys and terraces, and is comprised of quartz-rich sandstones, siltstones, mudstones and coal. These can form either broad lenticular or narrow linear bodies, which are often separated by erosional discontinuities.
- Mannville Group oil production and recovery is heavily reliant on enhanced oil recovery (EOR) technology. Processes such as cold production with sand (CHOPS), water flooding, cyclic steam stimulation (CSS), steam-assisted gravity drainage (SAGD) and solvent-aided production (SAP) have greatly extended the life of many Mannville Group pools. New technologies are continually being tested that will continue to make the Mannville Group one of the province's most prolific producers.
- The depth of the Mannville Group production ranges from ~820 feet (250 metres) in the north to ~278 feet (850 metres) in the south. The average API gravity of the oil is 13°.

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